



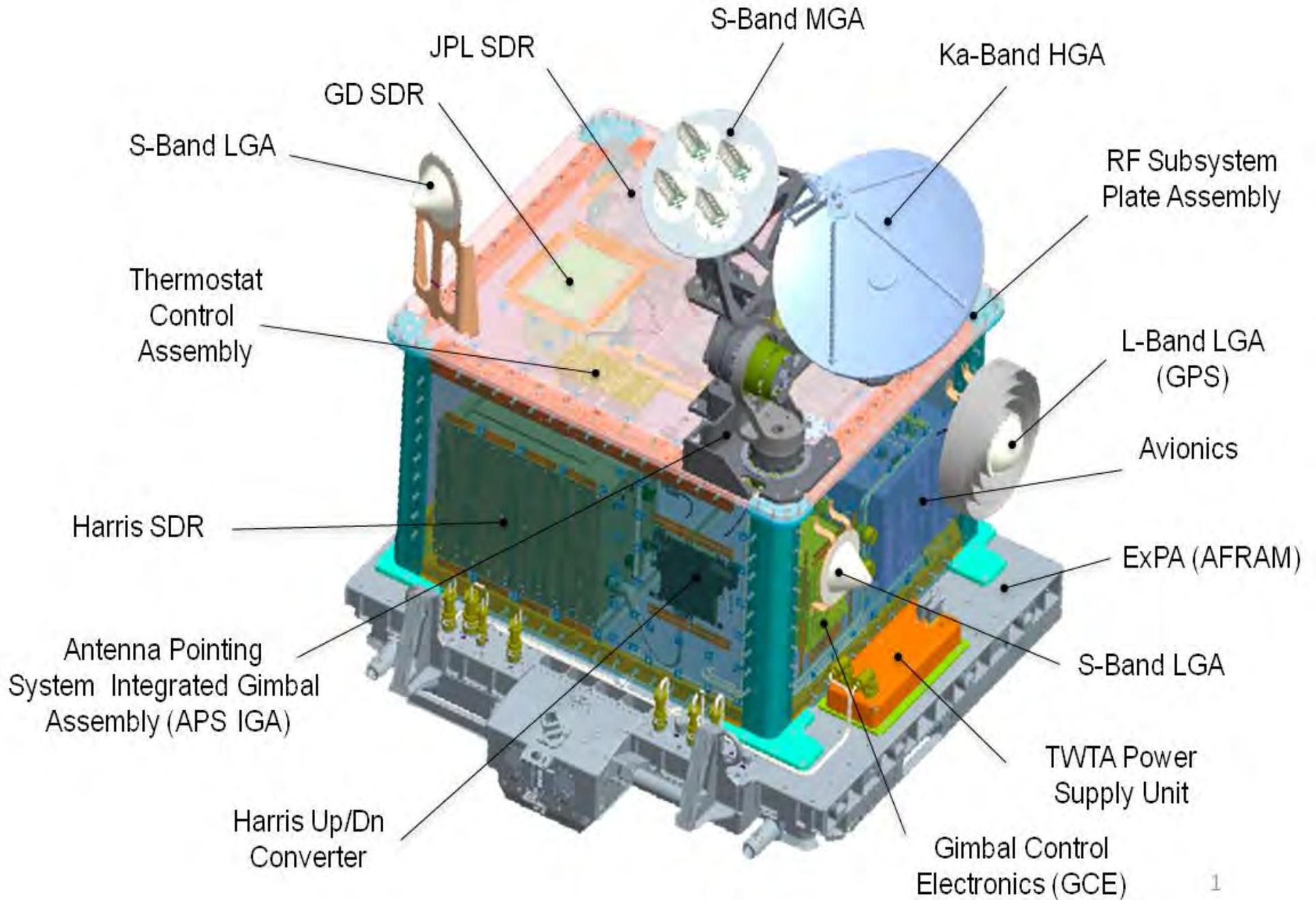
STRS Radio Service Software For NASA's SCaN Testbed

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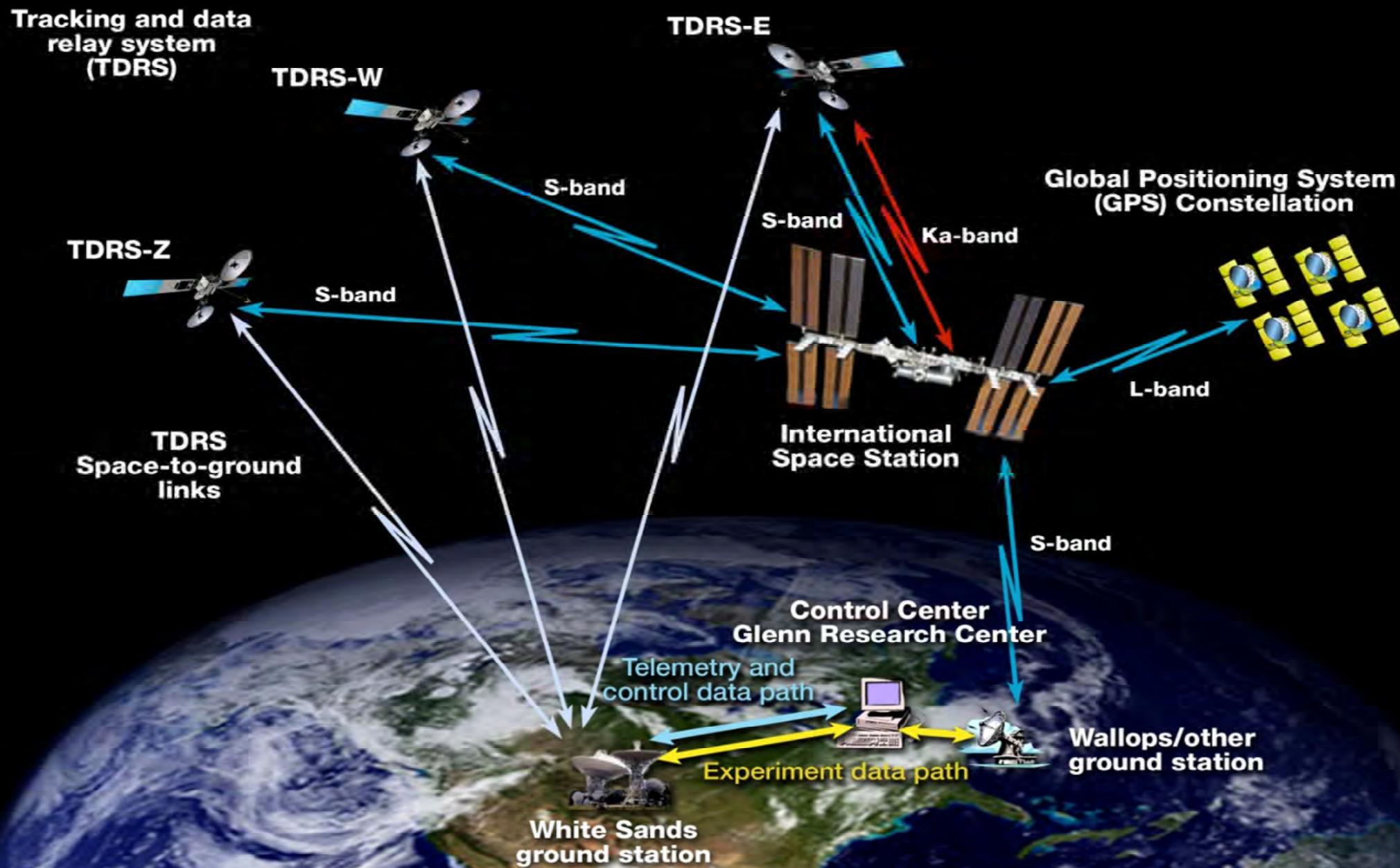


Space Communications and Navigation (SCaN) Testbed





SCaN Testbed Architecture





SCaN Testbed - subsystems

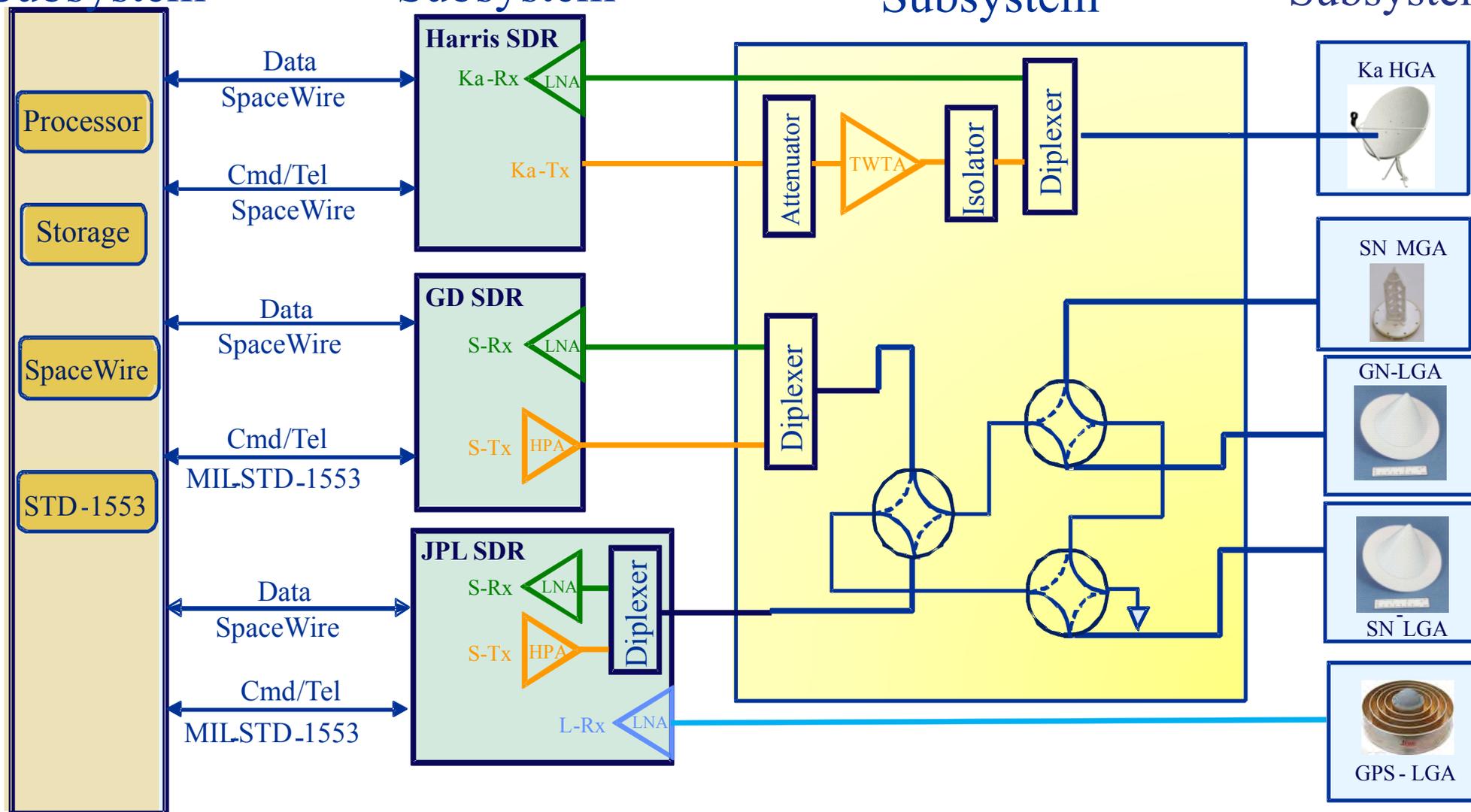


Avionics Subsystem

SDR Subsystem

RF Subsystem

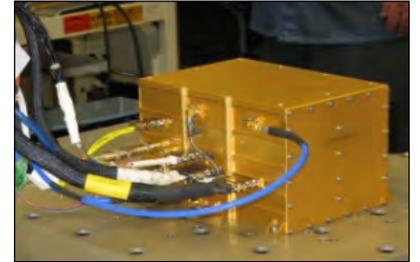
Antenna Subsystem





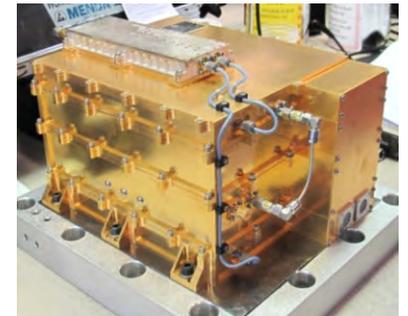
◆ General Dynamics (GD) SDR

- 60 MIPS Coldfire (VxWorks) and (1) QPRO FPGA
- S-Band transceiver (2.0 – 2.3 GHz) with 8W amp
- 1M chalcogenide non-volatile phase-change memory.



◆ Jet Propulsion Laboratory (JPL) / L3-CE SDR

- 66 MHz SPARC (RTEMS) and (2) Virtex2 FPGAs
- S-Band transceiver (2.0 – 2.3 GHz) with 7W amp
- L-Band receiver at L1, L2c, and L5 GPS frequencies



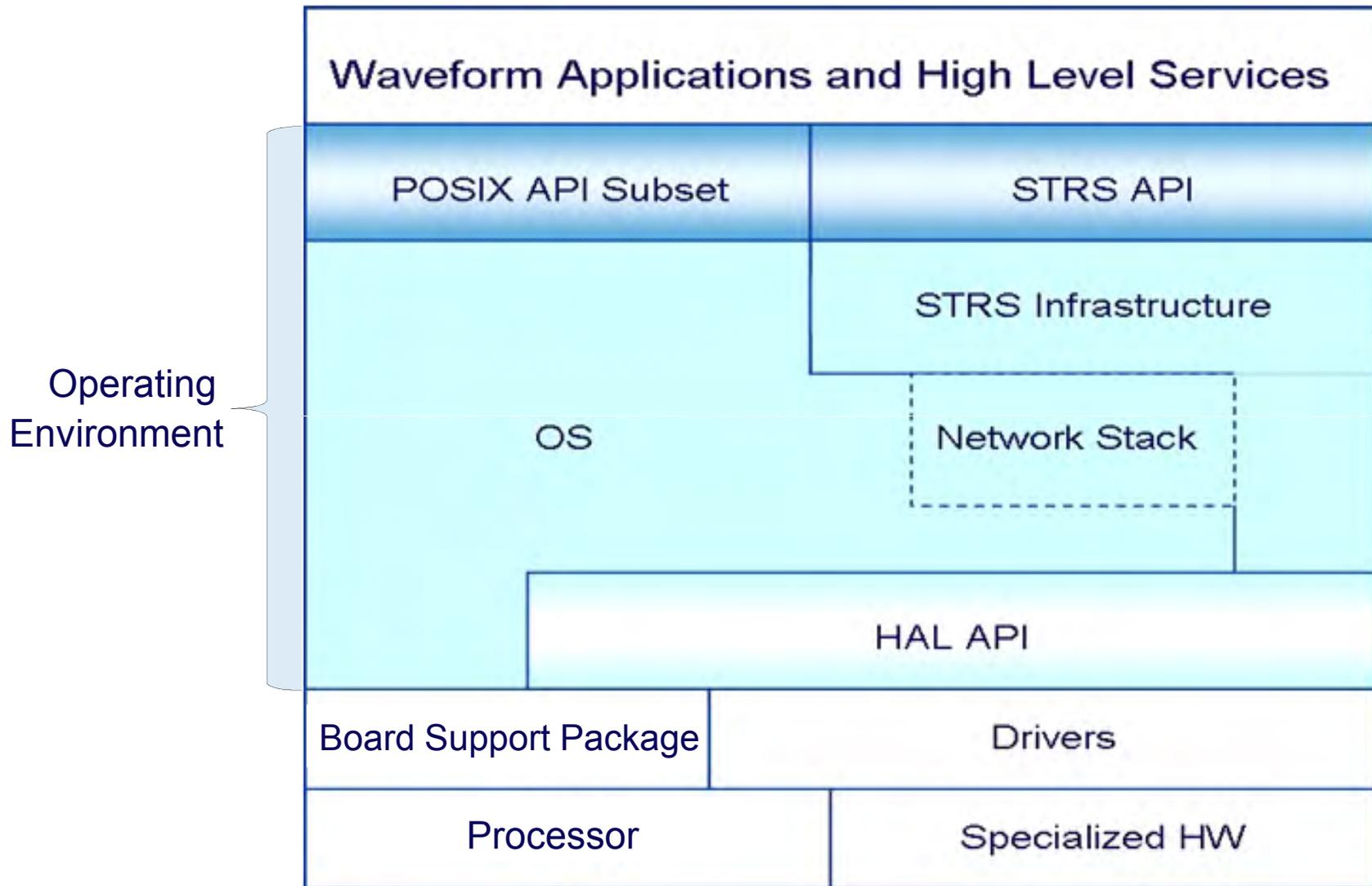
◆ Harris Corporation SDR

- 700 MIPS PowerPC (VxWorks) and (4) Virtex4 FPGAs
- Ka-Band transceiver (22 – 26 GHz) with 40W TWTA
- DSP for enhanced signal processing.





Space Telecommunications Radio System

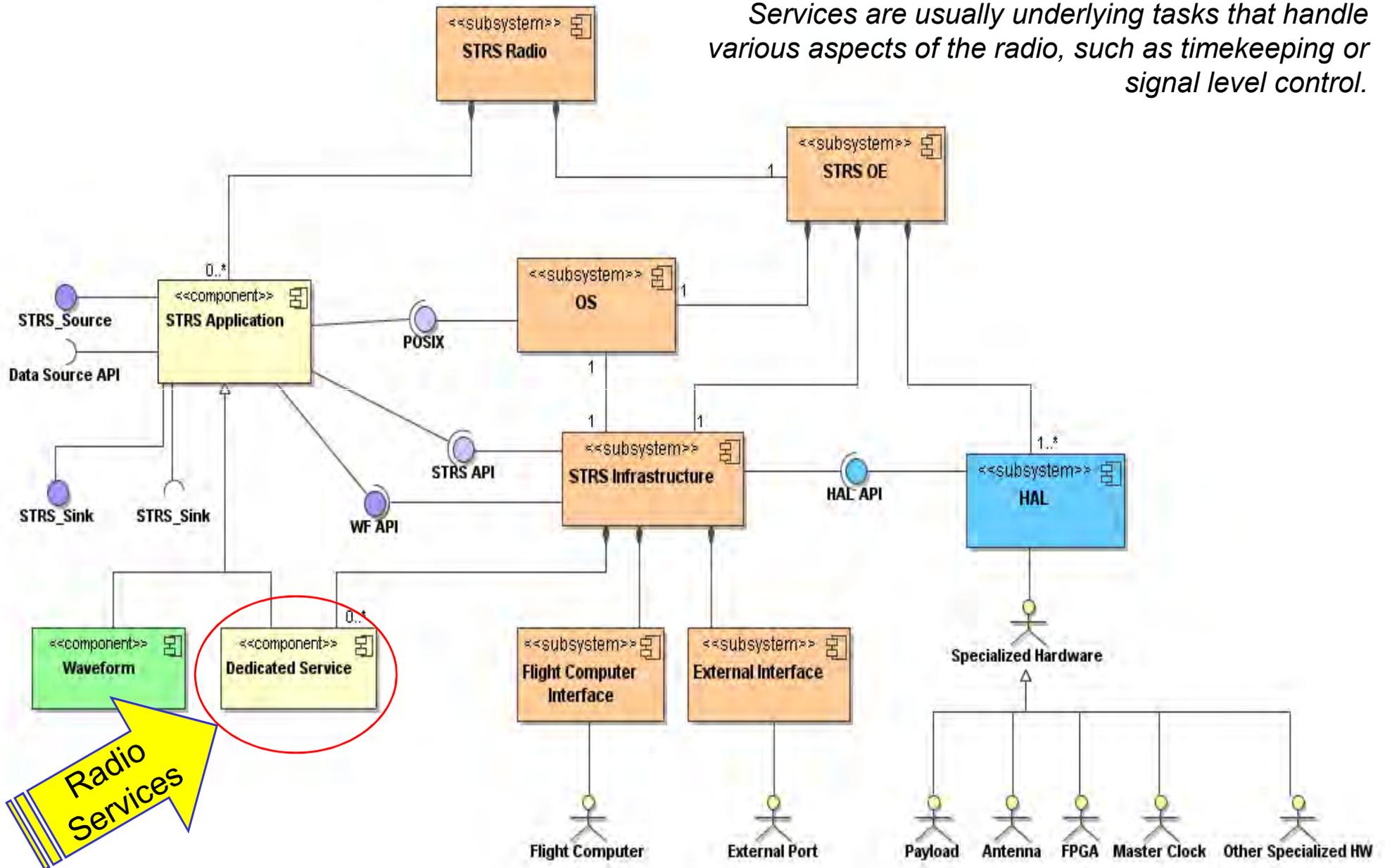




STRS Architecture Components - Radio Services

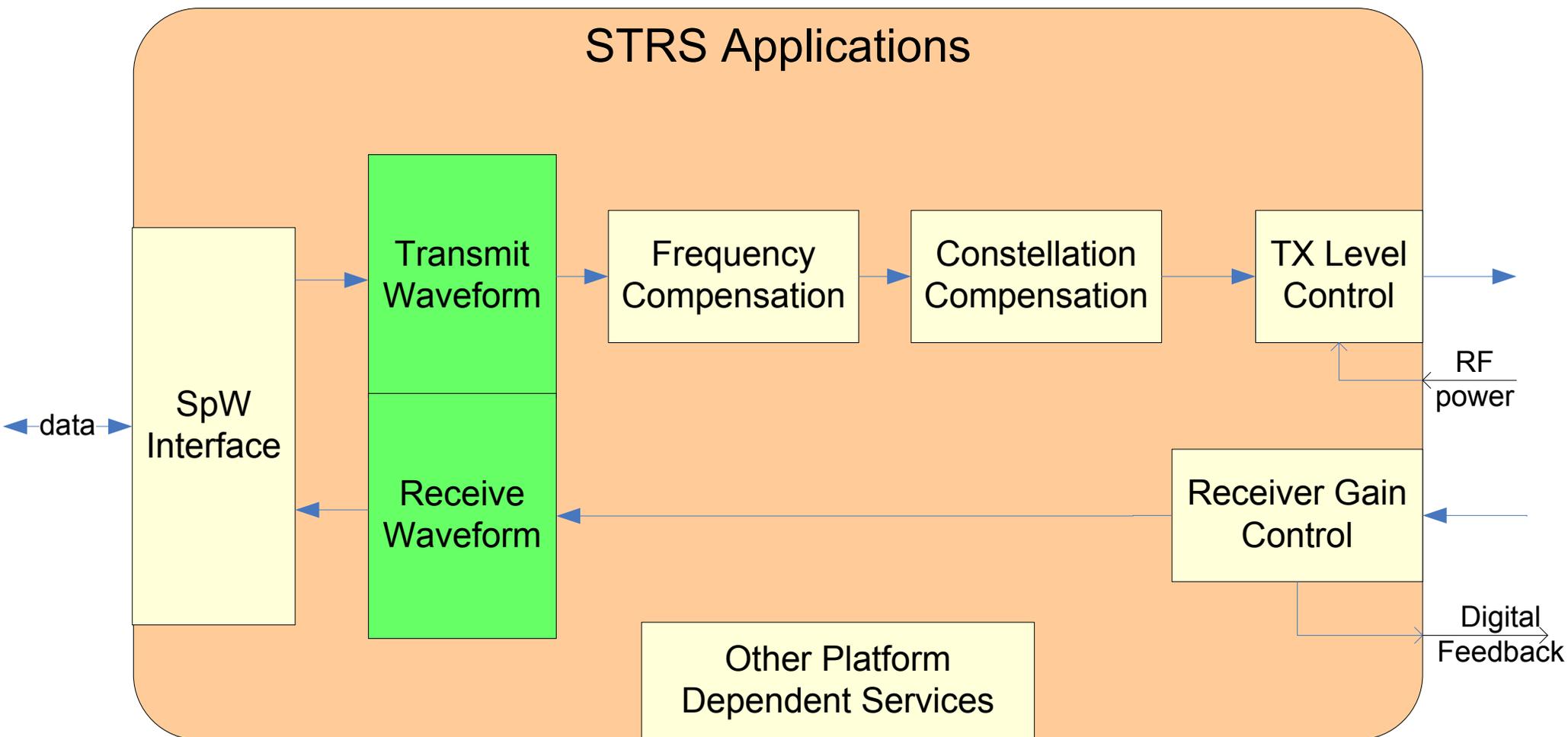


Services are usually underlying tasks that handle various aspects of the radio, such as timekeeping or signal level control.



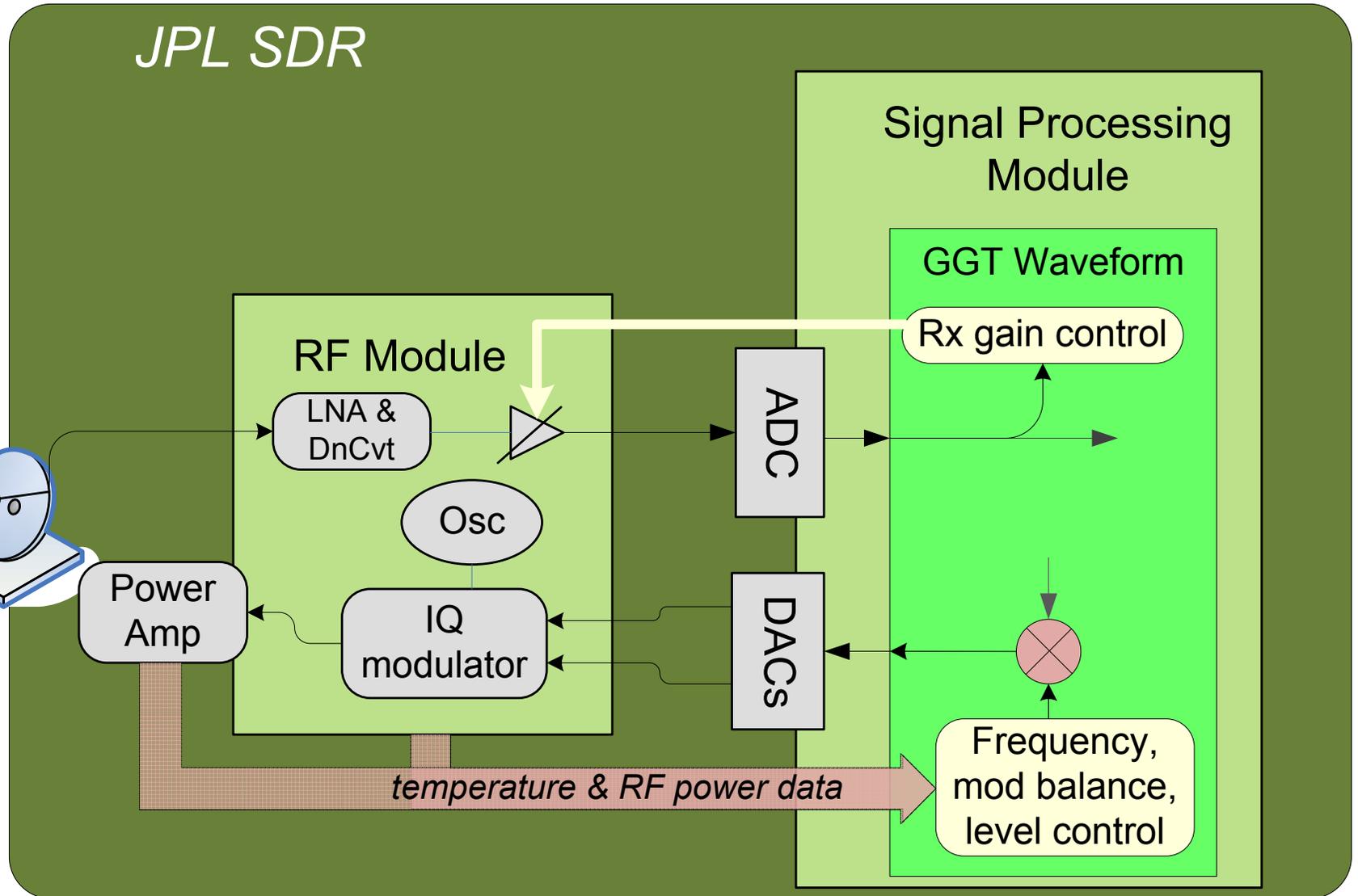


Radio Services in Waveform Signal Flow





Radio Services with RF Module



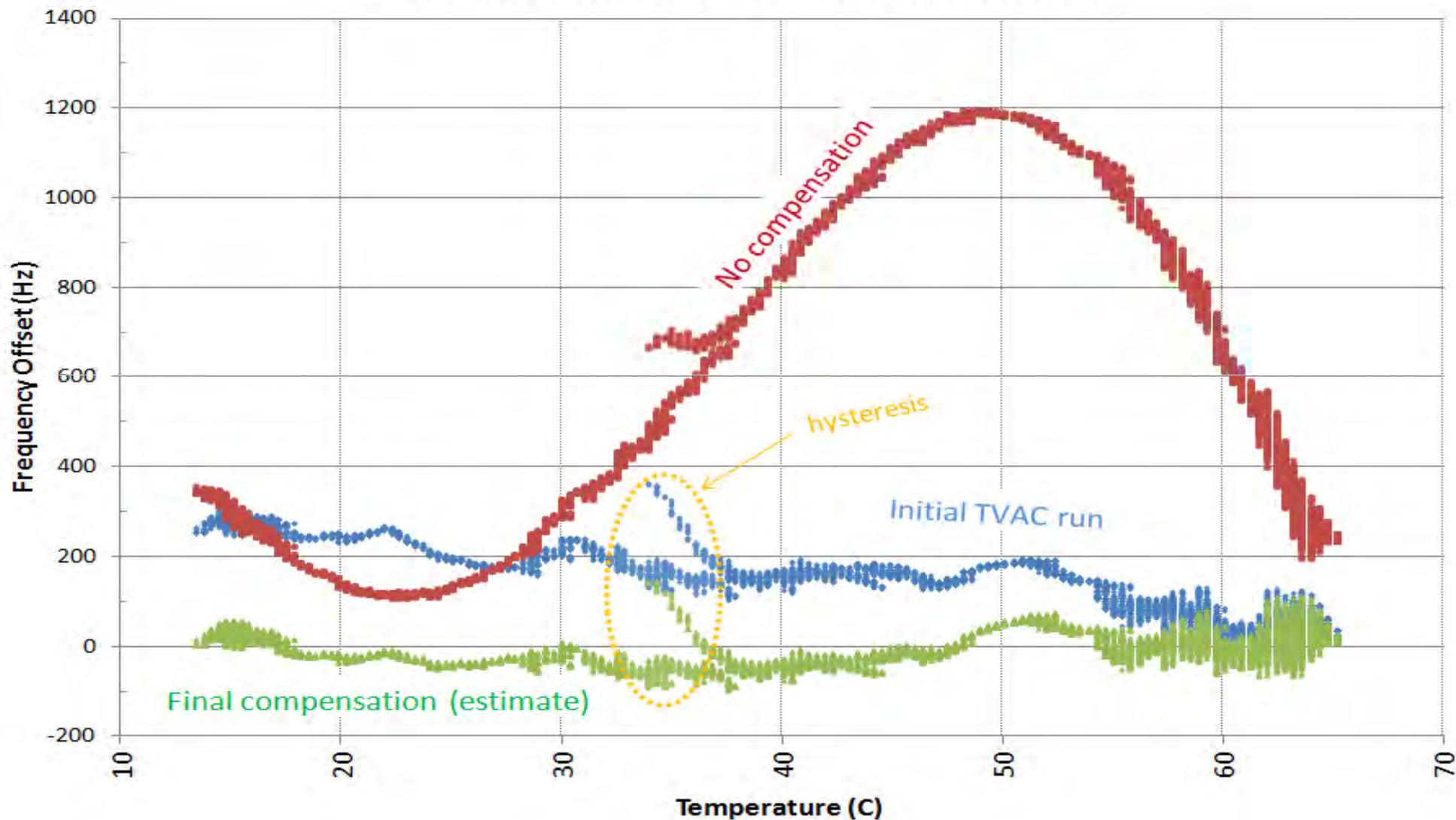
Services are re-configurable on-orbit.



Temperature Compensation - frequency



Frequency Offset vs. Oscillator Temperature



Baseband I & Q data frequency shifted to trim transmitter output over temp.

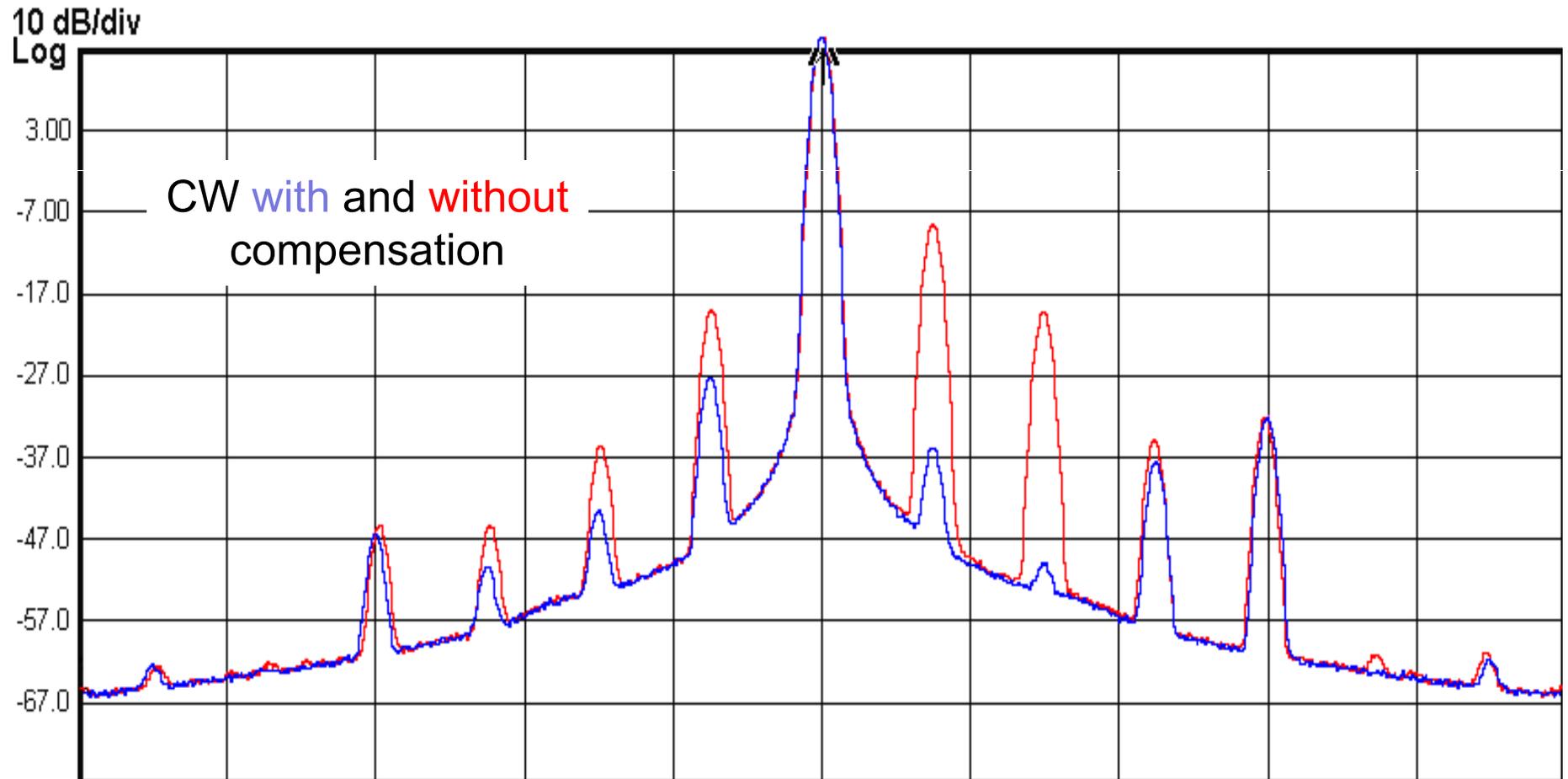


Temperature Compensation - modulator



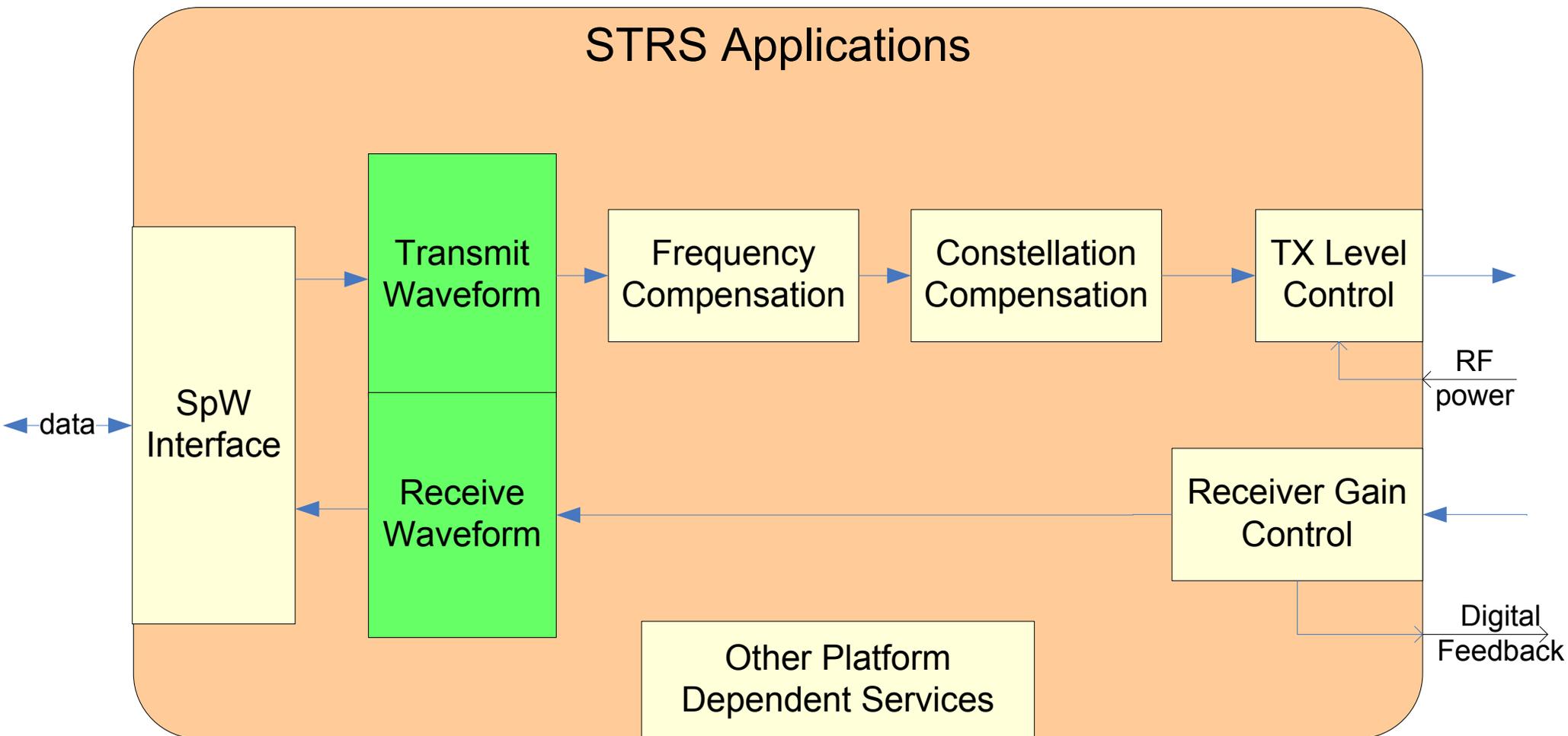
Digital baseband pre-compensation of analog modulator

- ◆ DC offsets
- ◆ DC levels
- ◆ Phase offset



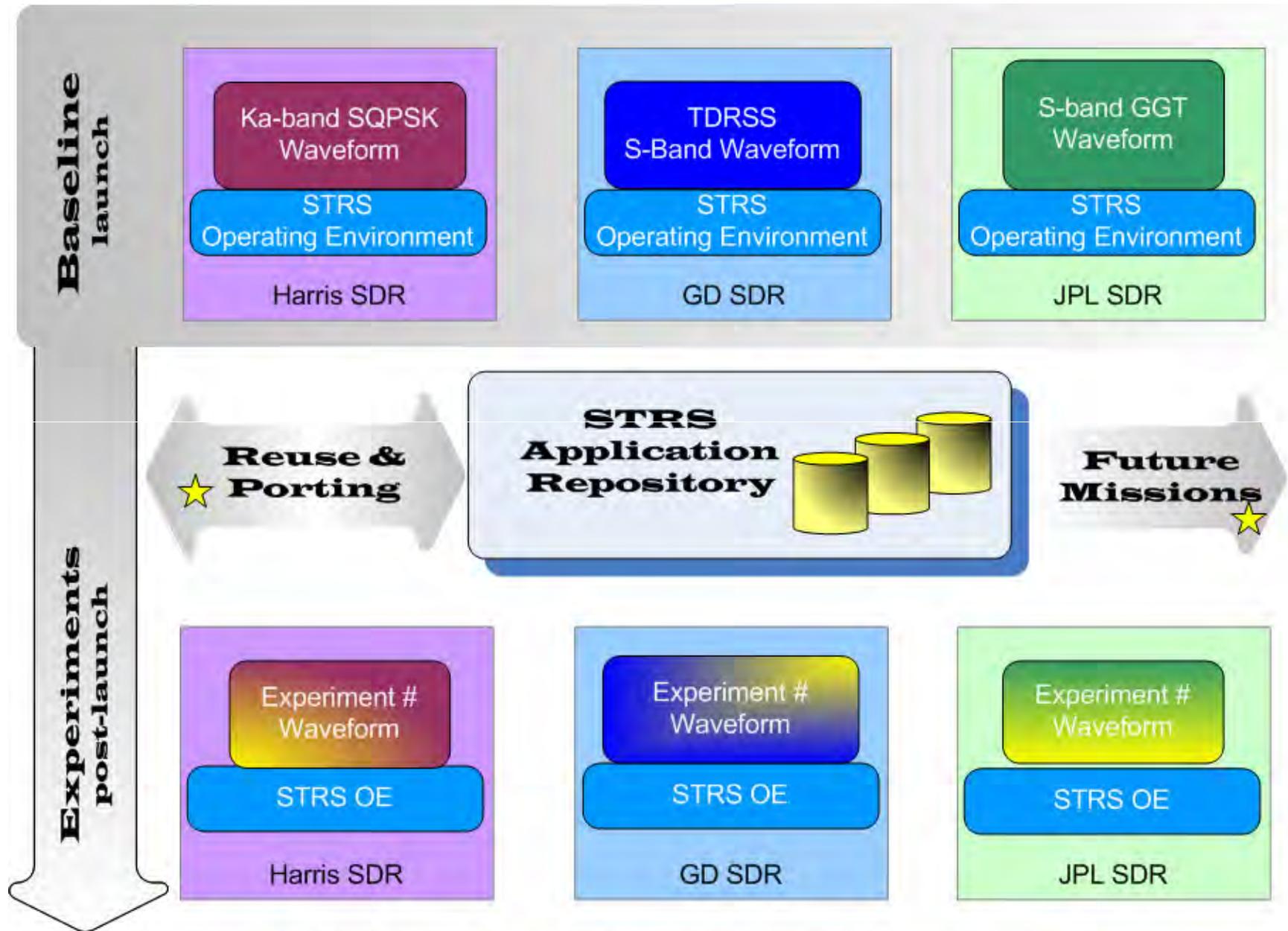


Radio Services in Waveform Signal Flow





SDR Waveforms – STRS Repository



★ Code reuse is subject to appropriate license agreements



Experimenters Welcome



<http://spaceflightsystems.grc.nasa.gov/SOPO/SCO/SCaNTestbed/>

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